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Tools for Sustainability Workshop

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February 17 - 18, 1999

Sponsored by the U.S. Environmental Protection Agency:

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Risk Reduction Engineering Laboratory
Cincinnati, Ohio 45268

Sustainability Technology Division

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Coordinated by:

Science Applications International Corporation (SAIC)
Reston, VA 21090

Tetra Tech EM Inc.
Vienna, VA 22182

Work Assignment Manager:
Terri D. Gosney
Risk Reduction Engineering Laboratory
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, Ohio 45268

Technical Advisor:
Ivars J. Licis
Risk Reduction Engineering Laboratory
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, Ohio 45268

NOTICE

These Proceedings have been reviewed in accordance with the U.S. Environmental Protection Agency's peer and administrative review policies and approved for presentation and publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

FOREWORD

Today's rapidly developing and changing technologies and industrial products and practices frequently carry with them the increased generation of materials that, if improperly dealt with, can threaten both public health and the environment. The U.S. Environmental Protection Agency is charged by Congress with protecting human health and the Nation's land, air, and water resources. Under a mandate of national environmental laws, the agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. These laws direct the EPA to perform research to define our environmental problems, measure the impacts, and search for solutions.

The National Risk Management Research Laboratory (NRMRL) is responsible for planning, implementing, and managing research, development, and demonstration programs to provide an authoritative, defensible engineering basis in support of the policies, programs, and regulations of the EPA. This publication is one of the products of that research and provides a vital communication link between the researcher and the user community.

EPA NRMRL's Sustainable Technology Division (STD) conducted this Workshop to present and discuss tools designed to assist environmental problem-solving and decision-making. Such tools will include those used for process and product design, optimization, impact assessment, and risk management intended to facilitate the exchange of information among its participants, the Workshop provided an opportunity for participants to present methods, concepts, and software for implementing pollution prevention (P2) and multimedia approaches as technical input and assistance for environmental decision-making. Participants representing various program offices of EPA along with other government organizations were invited to attend.

These proceedings from the 1999 Workshop provide the results of projects recently completed and current information on projects presently underway. Those wishing additional information on these projects are urged to contact the author. It is hoped the conclusions and recommendations reached at the Workshop will be the basis of a series of Workshops to be held in 1999 - 2001.

Subhas K. Sikdar
Director, Sustainable Technology Division

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INTRODUCTION

The Workshop on Tools for Sustainability was held in Arlington, VA on February 17-18, 1999. The purpose of this workshop was to present methods, concepts and software for implementing Pollution Prevention (P2) and aim for sustainability. Overall, these tools are designed to provide technical inputs for environmental decision-making.

The tools presented include integrated, multi-media concepts for helping to meet the Agency requirements for future regulatory and policy work and for industry to arrive at cleaner, better, and potentially cheaper methods of compliance. The Workshop encouraged dialogue as well as provided the opportunity for hands-on experience.

The Workshop was sponsored by the following organizations:

U.S. Environmental Protection Agency
Office of Research and Development
National Risk Management Research Laboratory
Sustainable Technology Division
Cincinnati, OH 45268

The following people were on the Workshop planning committee:

Ivars J. Licis
U.S. Environmental Protection Agency
National Risk Management Research Laboratory

Terri D. Gosney
U.S. Environmental Protection Agency
National Risk Management Research Laboratory

Jonathan G. Herrmann
U.S. Environmental Protection Agency
National Risk Management Research Laboratory

Robert Lipnick
U.S. Environmental Protection Agency
Office of Pollution Prevention and Toxic Control

List of Participants

Name	Affiliation
Kelly Leovic	EPA, NRMRL
Mary Ann Curran	EPA, NRMRL
Theresa Hogland	EPA, NRMRL
Claudette Reed	EPA, Region 3, Waste and Chemicals Management Division
Jim Baker	National Center for Clean Industrial and Treatment Technologies, Michigan Technological University
Jim Petrie	Center for Risk, Environmental Systems Technology & Analysis, University of Sydney
Jane Bare	EPA, NRMRL
Daniel Fort	EPA , Office of Pollution Prevention and Toxics
Ted MacDonald	EPA, NRMRL Office of International Activities
Terri Gosney	EPA, NRMRL
Douglas McKinney	EPA, NRMRL
Greg Carroll	EPA, NRMRL
Jonathan G. Herrmann	EPA, NRMRL
Joseph Carra	EPA, Office of Pollution Prevention and Toxics
Jean Shorett	Pacific Northwest National Laboratory
Robert Lipnick	EPA, Office of Pollution Prevention and Toxics
Mark Ralston	EPA, Office of Solid Waste
Ivars Licis	EPA, NRMRL
Vince Nabholz	EPA, Office of Pollution Prevention and Toxics
Carlos Nunez	EPA, NRMRL
Richard Engler	EPA, Office of Pollution Prevention and Toxics
Brain Valentine	U.S. Department of Energy
David Pennington	EPA, NRMRL
Douglas Young	EPA, NRMRL
John Crittenden	National Center of Clean Industrial and Treatment Technologies, Michigan Technological University
Eric Oman	Michigan Technological University
Heriberto Cabezas	EPA, NRMRL
William Punch	Michigan State University

Agenda: Wednesday, February 17, 1999

8:00 - 8:15	OPENING REMARKS (IVARS LICIS, ORD)
8:15 - 8:30	Welcome (Joe Carra, OPPT)
8:30 - 8:45	Workshop Objectives (Subhas Sikdar, ORD)
8:45 - 9:30	Life Cycle Assessment (LCA): Defining the Undefinable, Quantifying the Unquantifiable (Mary Ann Curran, ORD)
9:30 - 10:15	Use of Life Cycle Assessment in Effective Environmental Decision Making (Jim Petrie, Dept. of Chem. Engineering, University of Sydney)
10:15 - 10:30	BREAK
10:30 - 11:15	Consistent Science for Decision-Making: Experience with Saturn and the Tools for Reduction and Assessment of Chemical Impacts (TRACI) (Jane Bare, ORD)
11:15 - 12:00	Program for Assisting in Replacement of Industrial Solvents (PARIS) (Herb Cabezas, ORD)
12:00 - 1:30	LUNCH
1:30 - 1:40	Introduction (Dave Kling, OPPT)
1:40 - 1:45	Introductory Remarks (Dan Fort, OPPT)
1:45 - 1:55	Exposure Models (Tom Brennan, OPPT)
1:55 - 2:05	Green Chemistry Expert System (Rich Engler, OPPT)
2:05 - 2:15	OncoLogic Cancer Expert System for Prediction of Carcinogenic Potential of Chemicals (Yin-tak Woo, OPPT)
2:15 - 2:25	Ecological Structure Activity Relationships (ECOSAR) (Vince Nabholz, OPPT)
2:25 - 2:35	Risk Screening Environmental Indicators (RSEI) (Nick Bouwes, OPPT)
2:35 - 2:45	Environmental Accounting (Kristin Pierre, OPPT)
2:45 - 2:55	Design for the Environment (DfE) (John Sparks, OPPT)
2:55 - 3:05	P2 Assessment Framework (Bill Waugh, OPPT)
3:05 - 3:15	Conclusion (Dan Fort, OPPT)
3:15 - 5:30	Hands-on Demonstration and Posters (OPPT)

Agenda: Thursday, February 18, 1999

8:30 - 9:15	Mass Exchange Network (MEN) for Pollution Prevention (Vasilios Monosiouthakis, UCLA)
9:15 - 10:00	Tools from DOE/DOD, EPA Work in LCA (Ken Humphreys, PNL/DOE)
10:00 - 10:45	Chemical Process Simulation for Waste Reduction (WAR) (Doug Young, ORD)
10:45 - 11:00	BREAK
11:00 - 11:45	Waste Minimization Prioritization Tool (WMPT) (Mark Ralston, OSW)
11:45 - 1:15	P2 Tools From NCERQA Grants Program (Barbara Karn, ORD); National Center for Clean Industrial and Treatment Technologies (CenCITT); (JIm Baker, Michigan Technological University) Biodegradability and Environmental Simulation System (BESS) (William Punch, Michigan State University)
1:15 - 2:30	LUNCH
2:30 - 3:15	Tools for Finding Lower Volatility Products (Carlos Nunez, ORD)
3:15 - 4:00	Pollution Prevention Progress (P2P) (David Pennington, ORD)
4:00 - 4:15	BREAK
4:15 - 5:15	Discussion & Summary: Needs for Present and Future Tools (Subhas Sikdar, ORD,/Workshop participants)
5:15 - 5:45	Closing Remarks (Jon Herrmann, ORD/Bob Lipnick, OPPT)

Presentation Overviews

The focus of the Workshop was to share information on pollution prevention tools being developed by ORD and other Agency Programs, as well as by outside organizations. This meeting also served as a follow up to the joint ORD-OPPT Science Policy Dialogue on Pollution Prevention held at the same location on January 14. The opening remarks were made by; Ivars Licis, Subhas Sikdar, and Joe Carra.

Joe Carra emphasized the need for EPA to rethink the scope of P2 tools, moving beyond internal regulatory applications to promotion of sustainable business practices. Such tools can assist industry to steer development towards environmentally preferable starting materials, cleaner production processes, and environmentally preferable products. Moreover, a customer base outside the Agency can result in increased visibility and greater resources for further tool development and refinement.

The introductory remarks were followed by presentations by Mary Ann Curran (NRMRL) and Jim Petrie (U. Of Sydney) on life cycle assessment, followed by Jane Bare and Herb Cabezas (NRMRL) on two NRMRL decision-making tools (TRACI and PARIS)

The afternoon session, was moderated by Dan Fort (EETD), consisted of oral presentation and hands on demonstrations of OPPT tools: Exposure Models-Tom Brennan (EETD), Green Chemistry Expert System, Rich Engler (EETD), OncoLogic Cancer Expert System for Prediction of Carcinogenic Potential of Chemicals, Yin-tak Woo; Risk Screening Environmental Indicators (RSEI), Nick Bouwes (EETD), Environmental Accounting, Kristin Pierre (PPD), Design for the Environment (dfE), John Sparks (EETD), and the P2 Assessment Framework, Bill Waugh (RAD).

Day two consisted of six presentations including work supported by NCERQA Mass Exchange Network (MEN) for Pollution Prevention, Vasilios Monosiouthakis (UCLA); tools from DOE/DOD EPA work on LCA, Ken Humphreys (DOE); Chemical Process Simulation for Waste Reduction (WAR), Doug Yound (ORD); Waste Minimization Prioritization Tool (WMPT), Mark Ralston (OSW); P2 Tools from NCERQA Grants Program, Jim Baker (Michigan Technological University, National Center for Clean Industrial and Treatment Technologies); Biodegradability and Environmental simulation Systems, William Punch (Michigan State University).

Two presentations were presented in the afternoon session: Tools for finding Lower Volatility Products, Carlos Nunez (ORD); and Pollution Prevention Progress (P2P), David Pennington (ORD). These presentations were followed by a group discussion led by Subhas Sikdar (NRMRL) on Needs for Present and Future Tools.

Jon Herrmann (NRMRL) and Bob Lipnick (RAD) provided 30 minutes of closing remarks. Jon emphasized the need to avoid duplication; properly package tools; address question of relative risk; measure tool success and upgrade as required; consider relationships such as single vs multimedia; and examine what approaches to use such as looking for specific opportunities. Bob reiterated Joe Carra's introductory

remarks and identified the following potential next steps: (1) Continue the dialogue on P2 research and tools and exchange of information and software between EPA programs; (2) continue reaching out to customers/stakeholders; (3) follow up on the suggestion to leverage some ORD tools on the OPPT P2 Framework; (4) encourage greater OPPT/ORD work at the staff level; (5) investigate the utility of developing a virtual toolbox on EPA's website; (6) examine the issue of valuation with respect to the relationship of simulated exposure to health and environmental effects criteria; and (7) consider utility of RAD's ecosystem modeling work in support of P2 activities.

Discussion and Summary: Needs for Present and Future Tools

Slide Presentation

NEEDS FOR PRESENT AND FUTURE TOOLS

Subhas K. Sikdar
Director
Sustainable Technology Division
National Risk Management Research Laboratory
U.S. Environmental Protection Agency
Cincinnati, OH 45268

OBJECTIVES

- Present methods, concepts and software for implementing Pollution Prevention (P2)
- Present multimedia approaches as technical input and assistance for environmental decision-making

NEEDS FOR PRESENT AND FUTURE TOOLS

- Present methods, concepts and software for implementing Pollution Prevention (P2)
- Present multimedia approaches as technical input and assistance for environmental decision-making
- Future methods, concepts and software trends for Pollution Prevention (P2)
- Future approaches necessary for environmental decision-making

Jon Herrmann's Closing Remarks

Both OPPTS and ORD have many common interests in pollution prevention tools. With these common interests, how can we best move forward? There is no question that both organizations have learned much and shared much in the arena to pollution prevention tools for industry. There are, however, opportunities beyond the industrial sector. For example we might work together to address these questions:

- How best can we take into account economic and human behavior factors, as well as technical factors, in designing pollution prevention tools?

- How best can we address multi-media issues in pollution prevention, using integrated approaches that go beyond single medium, narrowly-focused concerns?

- How best can we use pollution prevention tools to encourage voluntary actions, thereby relying less on regulations and court-ordered mandates?

- How best can we apply the lessons of industrial pollution prevention tools to other sectors (e.g., agriculture, energy) and situations (e.g., watersheds, metropolitan areas)?

- How best can we transition from a command-and-control mind set to one that provides communities with the pollution prevention tools they need to make their own decisions?

OPPTS and ORD must look for concrete opportunities that move both organizations toward a closer working relationship. Such a relationship requires that we be able to conceptualize broadly, but look for discrete opportunities. Such a relationship requires that we visualize how what we do helps others and vis-a-vera, and that we do this by thinking long term – years, not days or weeks. Such a relationship requires that we develop personal contacts and improved working relationships at all levels -- seeking common interests and synergies across our organizations and our staffs. Such a relationship, of necessity, requires us to engage other EPA Program Offices and the Regions. What better way to do this than by deciding now to move forward in a collaboration that advances pollution prevention tools and their application in new ways and places with partners who can benefit from what we have to offer?

Questions and Conclusions Raised at the Workshop

Aside from the technical presentations, the Workshop allowed for some discussion among the participants. Several issues/concerns were discussed by the attendees.

- How do we make sure that we avoid duplication?
- How can we best package our tools?
- Do we need to quantitively compare relative risks of one problem to another, or will we continue to have tools based on subjective values?
- How do we maintain and improve the tools we produce and use (e.g., better data, new versions)?
- What are some of the critical shortcomings of these tools and is there a set of needs that could be identified as part of a future initiative?

Relationships To Consider

- Large versus small
- Industrial versus other applications/sectors
- Technical versus socioeconomic
- Single media versus multimedia
- command-and-control versus Community Based Environmental Protection

Approaches To Use

- Conceptualize broadly/look for specific opportunities
- Make contacts/develop relationships
- Seek common interests/encourage synergy
- Think in the longer term
- Additional workshops will be planned